

Abstract

The object of the present invention is to provide a diffusion preventing film capable of inhibiting diffusion of Cu into an insulator film when Cu is used as a wiring material. This objective is attained by forming the diffusion preventing film from a crystalline WCN film. The WCN film, when subjected to X-ray diffraction, shows peaks at a first position between  $36^{\circ}$  to  $38^{\circ}$  and at a second position between  $42^{\circ}$  to  $44^{\circ}$ . The half-width of the peak at the first position is  $3.2^{\circ}$  or less, and the half-width of the peak at the second position is  $2.6^{\circ}$  or less. Since the WCN film has satisfactory coverage, it can form a thick barrier film in a concave with a high aspect ratio.

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